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5 1. In a computer system including a host computer and at least one computer system resource accessible to the host computer, a method of responding to changes in a configuration of the computer system impacting a manner in which the at least one computer system resource is accessed by the host computer, the method comprising steps of:

(A) storing information relating to a first configuration of the computer system at a first point in time, the first configuration relating to a first manner of accessing the at least one computer system resource by the host computer;

10 (B) determining a second configuration of the computer system at a second point in time, the second configuration relating to a second manner of accessing the at least one computer system resource by the host computer;

15 (C) comparing the second configuration of the computer system with the first configuration to determine whether the second configuration differs from the first configuration; and

(D) when it is determined in the step (C) that the second configuration differs from the first configuration, determining the second manner of accessing the at least one computer system resource by the host computer.

20 2. The method of claim 1, wherein the step (B) includes a step of determining the second configuration of the computer system in response to a rebooting of the host computer.

25 3. The method of claim 1, wherein the step (B) includes a step of determining the second configuration of the computer system each time the host computer is rebooted.

4. The method of claim 1, wherein the at least one computer system resource includes a plurality of devices accessible by the host computer, and wherein the step (A) includes a step of storing the information relating to the first configuration in a form that includes at least one component of information that uniquely identifies each one of the plurality of devices

accessible by the host computer using information independent of the first configuration of the computer system.

5 5. The method of claim 4, wherein the at least one computer system resource includes at least one storage system and the plurality of devices includes a plurality of logical volumes of data in the at least one storage system, and wherein the step (A) includes a step of storing, for each one of the logical volumes, an identifier that uniquely identifies the logical volume among the plurality of logical volumes in the at least one storage system.

10 6. The method of claim 5, wherein the at least one storage system includes a plurality of storage systems, and wherein the step (A) includes a step of storing, for each one of the plurality of logical volumes, an identifier that uniquely identifies a one of the plurality of storage systems in which the one of the plurality of logical volumes is stored.

15 7. The method of claim 1, wherein the at least one computer system resource includes a plurality of devices accessible by the host computer, and wherein the step (A) includes a step of storing the information relating to the first configuration in a form that includes first and second identifiers for each one of the plurality of devices accessible by the host computer, the first identifier identifying the one of the plurality of devices using information relating to the first configuration of the computer system, the second identifier identifying the one of the plurality of devices using information independent of the first configuration of the computer system.

20 8. The method of claim 7, wherein the at least one computer system resource includes at least one storage system and the plurality of devices includes a plurality of logical
25 volumes of data, and wherein the step (A) includes a step of storing the first and second identifiers for each of the plurality of logical volumes, and wherein the second identifier for each one of the logical volumes uniquely identifies the logical volume among the plurality of logical volumes in the at least one storage system.

9. The method of claim 7, wherein the first identifier includes information descriptive of a path through which the one of the plurality of logical volumes is accessible to the host computer.

10. The method of claim 7, wherein the step (A) includes a step of storing the information relating to the first configuration in a form that further includes a third identifier for each one of the plurality of devices accessible by the host computer, the third identifier being formed from a piece of information that is obtainable by accessing the one of the plurality of devices at the first point in time.

11. The method of claim 10, wherein the step (B) includes a step of, for at least one of the first identifiers, querying the at least one of the plurality of devices corresponding to the at least one of the first identifiers at the second point in time to obtain the piece of information available by accessing the at least one of the plurality of devices, and wherein the step (C) includes a step of comparing the piece of information obtained in the step (B) to the third identifier stored in the step (A) to determine whether the second configuration differs from the first configuration with respect to the at least one of the plurality of devices.

12. The method of claim 1, wherein the at least one computer system resource includes a plurality of devices accessible by the host computer, and wherein the step (A) includes a step of storing the information relating to the first configuration in a form that includes an identifier for each one of the plurality of devices accessible by the host computer, the identifier being formed from a piece of information that is obtainable by accessing the one of the plurality of devices at the first point in time.

13. The method of claim 12, wherein the step (B) includes a step of querying at least one of the plurality of devices at the second point in time to obtain the piece of information available by accessing the at least one of the plurality of devices, and wherein the step (C) includes a step of comparing the piece of information obtained in the step (B) to the identifier

1 stored in the step (A) to determine whether the second configuration differs from the first configuration with respect to the at least one of the plurality of devices.

5 14. In a computer system including a host computer and at least one computer system resource accessible to at least one application program executing on the host computer, a method of reconfiguring the computer system, the method comprising a step of:

(A) dynamically reconfiguring the computer system, without reinitializing the host computer or the application program, to alter a manner in which the at least one application program accesses the at least one computer system resource.

10 15. The method of claim 14, further including steps of:

(B) prior to the step (A), suspending input/output (I/O) operations from the application program directed to the at least one computer system resource; and

(C) subsequent to the step (A), resuming I/O operations from the application program directed to the at least one computer system resource.

16. The method of claim 14, wherein:

the at least one computer system resource includes a storage system including a plurality of storage devices accessible by the host computer;

the host computer includes an application layer owning a plurality of logical objects;

the computer system further includes a mapping entity that includes at least one mapping layer mapping the plurality of logical objects from the application layer to a physical layer relating to the plurality of storage devices; and

the step (A) includes a step of dynamically updating the at least one mapping layer to reflect a change in the configuration of the computer system without reinitializing the mapping entity.

17. The method of claim 16, further comprising a step of:

(B) creating the mapping layer to include, for each one of the plurality of storage

devices accessible by the host computer, a first component of information that uniquely identifies the one of the plurality of storage devices accessible by the host computer using information dependent upon a configuration of the storage system and a second component of information that uniquely identifies the one of the plurality of storage devices accessible by the host computer using information obtainable from the storage system.

18. The method of claim 14, wherein the at least one computer system resource includes a storage system storing at least one logical volume of data, the storage system having at least first and second ports through which the at least one logical volume of data can be made accessible to the at least one application program executing on the host computer; and

wherein the step (A) includes a step of dynamically reconfiguring the computer system from a first configuration to a second configuration, wherein in the first configuration the at least one logical volume is accessible to the at least one application program executing on the host computer via the first port of the storage system, and wherein in the second configuration the at least one logical volume is accessible to the at least one application program executing on the host computer via the second port of the storage system.

19. The method of claim 16, wherein the step (A) includes a step of dynamically reconfiguring the computer system from a first configuration to a second configuration, wherein at least one physical connection between the host computer and the storage system differs between the first and second configurations.

20. The method of claim 14, wherein the at least one computer system resource includes a plurality of storage systems each storing a plurality of logical volumes of data, the plurality of storage systems including a first storage system and a second storage system; and wherein the step (A) includes a step of dynamically reconfiguring the computer system to move at least one of the plurality of logical volumes of data from the first storage system to the second storage system.

21. A method of updating mapping information in a computer system including a host computer, a storage system, and a mapping entity that includes at least one mapping layer including the mapping information, the host computer including an application layer owning at least one logical object, the at least one mapping layer mapping the at least one logical object from the application layer to a physical layer relating to physical storage locations on the storage system, the method comprising a step of:

(A) in response to a change in a configuration of the computer system, dynamically updating the mapping information in the at least one mapping layer to reflect the change in the configuration of the computer system without reinitializing the mapping entity.

22. The method of claim 21, wherein the host computer includes the mapping entity, and wherein the step (A) includes a step of dynamically updating the mapping information in the at least one mapping layer to reflect the change in the configuration of the computer system without reinitializing the host computer.

23. The method of claim 21, wherein the host computer includes the mapping entity, and an operating system, and wherein the step (A) includes a step of dynamically updating the mapping information in the at least one mapping layer to reflect the change in the configuration of the computer system without reinitializing the host computer operating system.

24. The method of claim 21, wherein the storage system stores a plurality of logical volumes accessible by the host computer, wherein the mapping layer includes, for each one of the logical volumes accessible by the host computer, a first component of information that uniquely identifies the one of the plurality of logical volumes using information dependent upon a configuration of the computer system and a second component of information that uniquely identifies the one of the plurality of logical volumes using a piece of information obtainable from the storage system, and wherein the step (A) includes, in response to a change in the configuration in the computer system that results in the piece of information obtainable from the

storage system for one of the plurality of logical volumes no longer matching the second component of information stored in the mapping layer for the one of the plurality of logical volumes, a step of:

updating one of the first and second components of information in the mapping layer for the one of the plurality of logical volumes.

25. The method of claim 24, wherein the step (A) includes a step of updating the second component of information for the one of the plurality of logical volumes based upon information received from the storage system relating to the at least one of the plurality of logical volumes.

26. A method of providing mapping information in a computer system including a host computer, at least one storage system and a mapping entity that includes at least one mapping layer including the mapping information, the host computer including an application layer owning a plurality of logical objects, the at least one storage system including a plurality of logical volumes accessible by the host computer, the at least one mapping layer mapping the plurality of logical objects from the application layer to a physical layer relating to the plurality of logical volumes, the method comprising steps of:

(A) providing the mapping layer with a first component of information that uniquely identifies each one of the plurality of logical volumes accessible by the host computer using information dependent upon a configuration of the computer system; and

(B) providing the mapping layer with a second component of information that uniquely identifies each one of the plurality of logical volumes accessible by the host computer using a piece of information obtainable from the at least one storage system.

27. The method of claim 26, further including a step of providing a mapping entry for each of the plurality of logical volumes, each mapping entry including the first and second components of information, and wherein the step (A) includes a step of providing the mapping layer with a first component of information that is descriptive of a path through which the

corresponding one of the plurality of logical volumes is accessible to the host computer.

28. The method of claim 27, further including a step of providing a mapping entry for each of the plurality of logical volumes, each mapping entry including the first and second components of information, and wherein the step (B) includes a step of providing the mapping layer with a second component of information that is independent of a path through which the corresponding one of the plurality of logical volumes is accessible to the host computer.

29. The method of claim 26, further including a step (C) of updating the mapping information in response to a change in the configuration of the computer system.

30. The method of claim 29, wherein the step (C) includes a step of, in response to a change in the configuration of the computer system that results in the piece of information obtainable from the storage system for one of the plurality of logical volumes no longer matching the second component of information stored in the mapping layer for the one of the plurality of logical volumes, updating one of the first and second components of information in the mapping layer for the one of the plurality of logical volumes.

31. The method of claim 30, wherein the step (C) includes a step of updating the second component of information for the one of the plurality of logical volumes based upon information received from the storage system relating to the at least one of the plurality of logical volumes.

32. The method of claim 27, further including a step of providing a mapping entry for each of the plurality of logical volumes, each mapping entry including the first and second components of information, and wherein the step (B) includes a step of providing the mapping layer with a second component of information that is independent of a path through which the corresponding one of the plurality of logical volumes is accessible to the host computer.

33. The method of claim 27, wherein the mapping layer is indexed by a unique identifier for each of the plurality of logical volumes that remains constant despite changes in the configuration of the computer system.

34. A computer readable medium encoded with a program for execution on a host computer in a computer system including the host computer and at least one computer system resource accessible to the host computer, the program, when executed on the host computer, performs a method of responding to changes in a configuration of the computer system impacting a manner in which the at least one computer system resource is accessed by the host computer, the method comprising steps of:

- (A) storing information relating to a first configuration of the computer system at a first point in time, the first configuration relating to a first manner of accessing the at least one computer system resource by the host computer;
- (B) determining a second configuration of the computer system at a second point in time, the second configuration relating to a second manner of accessing the at least one computer system resource by the host computer;
- (C) comparing the second configuration of the computer system with the first configuration to determine whether the second configuration differs from the first configuration; and
- (D) when it is determined in the step (C) that the second configuration differs from the first configuration, determining the second manner of accessing the at least one computer system resource by the host computer.

35. The computer readable medium of claim 34, wherein the step (B) includes a step of determining the second configuration of the computer system in response to a rebooting of the host computer.

36. The computer readable medium of claim 34, wherein the step (B) includes a step of determining the second configuration of the computer system each time the host computer is

rebooted.

37. The computer readable medium of claim 34, wherein the at least one computer system resource includes a plurality of devices accessible by the host computer, and wherein the step (A) includes a step of storing the information relating to the first configuration in a form that includes at least one component of information that uniquely identifies each one of the plurality of devices accessible by the host computer using information independent of the first configuration of the computer system.

38. The computer readable medium of claim 34, wherein the at least one computer system resource includes a plurality of devices accessible by the host computer, and wherein the step (A) includes a step of storing the information relating to the first configuration in a form that includes first and second identifiers for each one of the plurality of devices accessible by the host computer, the first identifier identifying the one of the plurality of devices using information relating to the first configuration of the computer system, the second identifier identifying the one of the plurality of devices using information independent of the first configuration of the computer system.

39. The computer readable medium of claim 38, wherein the at least one computer system resource includes at least one storage system and the plurality of devices includes a plurality of logical volumes of data, and wherein the step (A) includes a step of storing the first and second identifiers for each of the plurality of logical volumes, and wherein the second identifier for each one of the logical volumes uniquely identifies the logical volume among the plurality of logical volumes in the at least one storage system.

40. The computer readable medium of claim 38, wherein the first identifier includes information descriptive of a path through which the one of the plurality of logical volumes is accessible to the host computer.

41. The computer readable medium of claim 38, wherein the step (A) includes a step of storing the information relating to the first configuration in a form that further includes a third identifier for each one of the plurality of devices accessible by the host computer, the third identifier being formed from a piece of information that is obtainable by accessing the one of the plurality of devices at the first point in time.

42. The computer readable medium of claim 41, wherein the step (B) includes a step of, for at least one of the first identifiers, querying the at least one of the plurality of devices corresponding to the at least one of the first identifiers at the second point in time to obtain the piece of information available by accessing the at least one of the plurality of devices, and wherein the step (C) includes a step of comparing the piece of information obtained in the step (B) to the third identifier stored in the step (A) to determine whether the second configuration differs from the first configuration with respect to the at least one of the plurality of devices.

43. The computer readable medium of claim 34, wherein the at least one computer system resource includes a plurality of devices accessible by the host computer, and wherein the step (A) includes a step of storing the information relating to the first configuration in a form that includes an identifier for each one of the plurality of devices accessible by the host computer, the identifier being formed from a piece of information that is obtainable by accessing the one of the plurality of devices at the first point in time.

44. The computer readable medium of claim 43, wherein the step (B) includes a step of querying at least one of the plurality of devices at the second point in time to obtain the piece of information available by accessing the at least one of the plurality of devices, and wherein the step (C) includes a step of comparing the piece of information obtained in the step (B) to the identifier stored in the step (A) to determine whether the second configuration differs from the first configuration with respect to the at least one of the plurality of devices.

Sub B 45. A computer readable medium encoded with a reconfiguration program for

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execution on a host computer in a computer system including the host computer and at least one computer system resource accessible to at least one application program executing on the host computer, the reconfiguration program, when executed on the host computer, performs a method of reconfiguring the computer system, the method comprising a step of:

- 5 (A) dynamically reconfiguring the computer system, without reinitializing the host computer or the application program, to alter a manner in which the at least one application program accesses the at least one computer system resource.

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10 46. The computer readable medium of claim 45, wherein:
the at least one computer system resource includes a storage system including a plurality of storage devices accessible by the host computer;

the host computer includes an application layer owning a plurality of logical objects;
the computer system further includes a mapping entity that includes at least one mapping layer mapping the plurality of logical objects from the application layer to a physical layer relating to the plurality of storage devices; and

15 the step (A) includes a step of dynamically updating the at least one mapping layer to reflect a change in the configuration of the computer system without reinitializing the mapping entity.

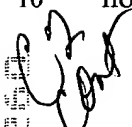
20 47. The computer readable medium of claim 46, further comprising a step of:

(B) creating the mapping layer to include, for each one of the plurality of storage devices accessible by the host computer, a first component of information that uniquely identifies the one of the plurality of storage devices accessible by the host computer using information dependent upon a configuration of the storage system and a second
25 component of information that uniquely identifies the one of the plurality of storage devices accessible by the host computer using information obtainable from the storage system.

48. The computer readable medium of claim 45, wherein the at least one computer

system resource includes a storage system storing at least one logical volume of data, the storage system having at least first and second ports through which the at least one logical volume of data can be made accessible to the at least one application program executing on the host computer; and

5 wherein the step (A) includes a step of dynamically reconfiguring the computer system from a first configuration to a second configuration, wherein in the first configuration the at least one logical volume is accessible to the at least one application program executing on the host computer via the first port of the storage system, and wherein in the second configuration the at least one logical volume is accessible to the at least one application program executing on the host computer via the second port of the storage system.

10  49. The computer readable medium of claim 46, wherein the step (A) includes a step of dynamically reconfiguring the computer system from a first configuration to a second configuration, wherein at least one physical connection between the host computer and the storage system differs between the first and second configurations.

15 50. The computer readable medium of claim 45, wherein the at least one computer system resource includes a plurality of storage systems each storing a plurality of logical volumes of data, the plurality of storage systems including a first storage system and a second storage system; and

20 wherein the step (A) includes a step of dynamically reconfiguring the computer system to move at least one of the plurality of logical volumes of data from the first storage system to the second storage system.

25 51. A computer readable medium encoded with a program for execution on a host computer in a computer system including the host computer, a storage system, and a mapping entity that includes at least one mapping layer including the mapping information, the host computer including an application layer owning at least one logical object, the at least one mapping layer mapping the at least one logical object from the application layer to a physical

layer relating to physical storage locations on the storage system, the program, when executed on the host computer, performs a method of updating mapping information in the computer system, the method comprising a step of:

(A) in response to a change in a configuration of the computer system, dynamically
5 updating the mapping information in the at least one mapping layer to reflect the change in the configuration of the computer system without reinitializing the mapping entity.

52. The computer readable medium of claim 51, wherein the host computer includes the mapping entity, and wherein the step (A) includes a step of dynamically updating the
10 mapping information in the at least one mapping layer to reflect the change in the configuration of the computer system without reinitializing the host computer.

53. The computer readable medium of claim 51, wherein the host computer includes the mapping entity, and an operating system, and wherein the step (A) includes a step of
15 dynamically updating the mapping information in the at least one mapping layer to reflect the change in the configuration of the computer system without reinitializing the host computer operating system.

54. The computer readable medium of claim 51, wherein the storage system stores a
20 plurality of logical volumes accessible by the host computer, wherein the mapping layer includes, for each one of the logical volumes accessible by the host computer, a first component of information that uniquely identifies the one of the plurality of logical volumes using information dependent upon a configuration of the computer system and a second component of information that uniquely identifies the one of the plurality of logical volumes using a piece of information
25 obtainable from the storage system, and wherein the step (A) includes, in response to a change in the configuration in the computer system that results in the piece of information obtainable from the storage system for one of the plurality of logical volumes no longer matching the second component of information stored in the mapping layer for the one of the plurality of logical volumes, a step of:

updating one of the first and second components of information in the mapping layer for the one of the plurality of logical volumes.

55. The computer readable medium of claim 54, wherein the step (A) includes a step of updating the second component of information for the one of the plurality of logical volumes based upon information received from the storage system relating to the at least one of the plurality of logical volumes.

56. A computer readable medium encoded with a program for execution on a host computer in a computer system including the host computer, at least one storage system and a mapping entity that includes at least one mapping layer including the mapping information, the host computer including an application layer owning a plurality of logical objects, the at least one storage system including a plurality of logical volumes accessible by the host computer, the at least one mapping layer mapping the plurality of logical objects from the application layer to a physical layer relating to the plurality of logical volumes, the program, when executed on the host computer, performs a method of providing the mapping information, the method comprising steps of:

(A) providing the mapping layer with a first component of information that uniquely identifies each one of the plurality of logical volumes accessible by the host computer using information dependent upon a configuration of the computer system; and

(B) providing the mapping layer with a second component of information that uniquely identifies each one of the plurality of logical volumes accessible by the host computer using a piece of information obtainable from the at least one storage system.

57. The computer readable medium of claim 56, wherein the program further includes a step of providing a mapping entry for each of the plurality of logical volumes, each mapping entry including the first and second components of information, and wherein the step (A) includes a step of providing the mapping layer with a first component of information that is descriptive of a path through which the corresponding one of the plurality of logical volumes is accessible to the

host computer.

58. The computer readable medium of claim 57, wherein the program further includes a step of providing a mapping entry for each of the plurality of logical volumes, each mapping entry including the first and second components of information, and wherein the step (B) includes a step of providing the mapping layer with a second component of information that is independent of a path through which the corresponding one of the plurality of logical volumes is accessible to the host computer.

59. The computer readable medium of claim 56, wherein the program further includes a step (C) of, in response to a change in the configuration of the computer system that results in the piece of information obtainable from the storage system for one of the plurality of logical volumes no longer matching the second component of information stored in the mapping layer for the one of the plurality of logical volumes, updating one of the first and second components of information in the mapping layer for the one of the plurality of logical volumes.

60. The computer readable medium of claim 59, wherein the step (C) includes a step of updating the second component of information for the one of the plurality of logical volumes based upon information received from the storage system relating to the at least one of the plurality of logical volumes.

61. The computer readable medium of claim 57, wherein the program further includes a step of providing a mapping entry for each of the plurality of logical volumes, each mapping entry including the first and second components of information, and wherein the step (B) includes a step of providing the mapping layer with a second component of information that is independent of a path through which the corresponding one of the plurality of logical volumes is accessible to the host computer.

62. A host computer for use in a computer system including the host computer and at

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least one computer system resource accessible to the host computer, the host computer comprising:

storing means for storing information relating to a first configuration of the computer system at a first point in time, the first configuration relating to a first manner of accessing the at least one computer system resource by the host computer;

first determining means for determining a second configuration of the computer system at a second point in time, the second configuration relating to a second manner of accessing the at least one computer system resource by the host computer;

comparing means for comparing the second configuration of the computer system with the first configuration to determine whether the second configuration differs from the first configuration; and

second determining means for determining the second manner of accessing the at least one computer system resource by the host computer when it is determined by the first determining means that the second configuration differs from the first configuration.

63. The host computer of claim 62, wherein the first determining means includes means for determining the second configuration of the computer system in response to a rebooting of the host computer.

64. The host computer of claim 62, wherein the at least one computer system resource includes a plurality of devices accessible by the host computer, and wherein the storing means includes means for storing the information relating to the first configuration in a form that includes at least one component of information that uniquely identifies each one of the plurality of devices accessible by the host computer using information independent of the first configuration of the computer system.

65. The host computer of claim 62, wherein the at least one computer system resource includes a plurality of devices accessible by the host computer, and wherein the storing means includes means for storing the information relating to the first configuration in a form that

includes first and second identifiers for each one of the plurality of devices accessible by the host computer, the first identifier identifying the one of the plurality of devices using information relating to the first configuration of the computer system, the second identifier identifying the one of the plurality of devices using information independent of the first configuration of the computer system.

66. The host computer of claim 65, wherein the at least one computer system resource includes at least one storage system and the plurality of devices includes a plurality of logical volumes of data, and wherein the storing means includes means for storing the first and second identifiers for each of the plurality of logical volumes, and wherein the second identifier for each one of the logical volumes uniquely identifies the logical volume among the plurality of logical volumes in the at least one storage system.

67. The host computer of claim 65, wherein the first identifier includes information descriptive of a path through which the one of the plurality of logical volumes is accessible to the host computer.

68. The host computer of claim 65, wherein the storing means includes means for storing the information relating to the first configuration in a form that further includes a third identifier for each one of the plurality of devices accessible by the host computer, the third identifier being formed from a piece of information that is obtainable by accessing the one of the plurality of devices at the first point in time.

69. The host computer of claim 68, wherein the first determining means includes means for querying the at least one of the plurality of devices corresponding to at least one of the first identifiers at the second point in time to obtain the piece of information available by accessing the at least one of the plurality of devices, and wherein the comparing means includes means for comparing the piece of information obtained by the first determining means to the third identifier stored by the storing means to determine whether the second configuration differs from

the first configuration with respect to the at least one of the plurality of devices.

70. The host computer of claim 62, wherein the at least one computer system resource includes a plurality of devices accessible by the host computer, and wherein the storing means
5 includes means for storing the information relating to the first configuration in a form that includes an identifier for each one of the plurality of devices accessible by the host computer, the identifier being formed from a piece of information that is obtainable by accessing the one of the plurality of devices at the first point in time.

10 71. The host computer of claim 70, wherein the first determining means includes means for querying at least one of the plurality of devices at the second point in time to obtain the piece of information available by accessing the at least one of the plurality of devices, and wherein comparing means includes means for comparing the piece of information obtained by the
15 first determining means to the identifier stored by the storing means to determine whether the second configuration differs from the first configuration with respect to the at least one of the plurality of devices.

20 72. A host computer for use in a computer system including the host computer and at least one computer system resource accessible to at least one application program executing on the host computer, the host computer comprising:

at least one controller to dynamically reconfigure the computer system, without reinitializing the host computer or the application program, to alter a manner in which the at least one application program accesses the at least one computer system resource.

25 73. The host computer of claim 72, wherein:
the at least one computer system resource includes a storage system including a plurality of storage devices accessible by the host computer;
the host computer includes an application layer owning a plurality of logical objects and a mapping entity that includes at least one mapping layer mapping the plurality of logical objects

from the application layer to a physical layer relating to the plurality of storage devices; and
the at least one controller is further configured to dynamically update the at least one
mapping layer to reflect a change in the configuration of the computer system without
reinitializing the mapping entity.

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74. The host computer of claim 73, wherein the at least one controller is further
configured to:

create the mapping layer to include, for each one of the plurality of storage devices
accessible by the host computer, a first component of information that uniquely identifies the one
of the plurality of storage devices accessible by the host computer using information dependent
upon a configuration of the storage system and a second component of information that uniquely
identifies the one of the plurality of storage devices accessible by the host computer using
information obtainable from the storage system.

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75. The host computer of claim 72, wherein the at least one computer system resource
includes a storage system storing at least one logical volume of data, the storage system having at
least first and second ports through which the at least one logical volume of data can be made
accessible to the at least one application program executing on the host computer; and

wherein the at least one controller is further configured to dynamically reconfigure the
computer system from a first configuration to a second configuration, wherein in the first
configuration the at least one logical volume is accessible to the at least one application program
executing on the host computer via the first port of the storage system, and wherein in the second
configuration the at least one logical volume is accessible to the at least one application program
executing on the host computer via the second port of the storage system.

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76. The host computer of claim 73, wherein the at least one controller is configured to:
dynamically reconfigure the computer system from a first configuration to a second
configuration, wherein at least one physical connection between the host computer and the
storage system differs between the first and second configurations.

5 77. The host computer of claim 72, wherein the at least one computer system resource includes a plurality of storage systems each storing a plurality of logical volumes of data, the plurality of storage systems including a first storage system and a second storage system; and wherein the at least one controller is configured to dynamically reconfigure the computer system to move at least one of the plurality of logical volumes of data from the first storage system to the second storage system.

10 78. A host computer for use in a computer system including the host computer, a storage system, and a mapping entity that includes at least one mapping layer including the mapping information, the host computer comprising:

an application layer owning at least one logical object, the at least one mapping layer mapping the at least one logical object from the application layer to a physical layer relating to physical storage locations on the storage system; and

15 at least one controller configured to dynamically update the mapping information in the at least one mapping layer to reflect the change in the configuration of the computer system without reinitializing the mapping entity in response to a change in a configuration of the computer system.

20 79. The host computer of claim 78, wherein the host computer includes the mapping entity, and wherein the at least one controller is further configured to:

dynamically update the mapping information in the at least one mapping layer to reflect the change in the configuration of the computer system without reinitializing the host computer.

25 80. The host computer of claim 78, wherein the storage system stores a plurality of logical volumes accessible by the host computer, wherein the mapping layer includes, for each one of the logical volumes accessible by the host computer, a first component of information that uniquely identifies the one of the plurality of logical volumes using information dependent upon a configuration of the computer system and a second component of information that uniquely identifies the one of the plurality of logical volumes using a piece of information obtainable from

the storage system, and wherein the at least one controller is configured to:

update one of the first and second components of information in the mapping layer for the one of the plurality of logical volumes in response to a change in the configuration in the computer system that results in the piece of information obtainable from the storage system for one of the plurality of logical volumes no longer matching the second component of information stored in the mapping layer for the one of the plurality of logical volumes.

81. The host computer of claim 78, wherein the controller is configured to update the second component of information for the one of the plurality of logical volumes based upon information received from the storage system relating to the at least one of the plurality of logical volumes.

82. A host computer for use in a computer system including the host computer, at least one storage system and a mapping entity that includes at least one mapping layer including the mapping information, the host computer including an application layer owning a plurality of logical objects, the at least one storage system including a plurality of logical volumes accessible by the host computer, the at least one mapping layer mapping the plurality of logical objects from the application layer to a physical layer relating to the plurality of logical volumes, the host computer comprising at least one controller configured to:

provide the mapping layer with a first component of information that uniquely identifies each one of the plurality of logical volumes accessible by the host computer using information dependent upon a configuration of the computer system; and

provide the mapping layer with a second component of information that uniquely identifies each one of the plurality of logical volumes accessible by the host computer using a piece of information obtainable from the at least one storage system.

83. The host computer of claim 82, wherein the at least one controller is further configured to:

provide a mapping entry for each of the plurality of logical volumes, each mapping entry

including the first and second components of information, the first component of information being descriptive of a path through which the corresponding one of the plurality of logical volumes is accessible to the host computer, being independent of a path through which the corresponding one of the plurality of logical volumes is accessible to the host computer.

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84. The host computer of claim 82, wherein the at least one controller is further configured to:

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update one of the first and second components of information in the mapping layer for the one of the plurality of logical volumes in response to a change in the configuration of the computer system that results in the piece of information obtainable from the storage system for one of the plurality of logical volumes no longer matching the second component of information stored in the mapping layer for the one of the plurality of logical volumes.

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